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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,066	07/26/2001	Kazuto Nishida	2001-1055A	5756

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EXAMINER

HARAN, JOHN T

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 02/24/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/890,066

Applicant(s)

NISHIDA ET AL.

Examiner

John T. Haran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-71 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.
2. This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.
3. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-4, 6-7, 10, 12, 14-17, 20, 22, 23, 44, and 48, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a bump on an electrode of an electronic component, mounting the electronic component to a board with an anisotropic conductive layer, and bonding under heat and pressure with at least 20 gf per bump.

Group II, claim(s) 5, 11, 43, 45, 50-53, 56, 58, 62 and 67, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a gold bump on an electrode of an electronic component, mounting the electronic component to a board with an anisotropic conductive layer, metallurgically bonding the gold bump to an electrode on the board with supersonic waves and bonding under heat and pressure with at least 20 gf per bump.

Group III, claim(s) 8, 9, 13, 54, 57, 63, and 68, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a bump on an electrode of an electronic component, mounting the electronic component to a board with an anisotropic conductive layer, and bonding under heat and pressure and lessening the pressure during the bonding.

Group IV, claim(s) 18, 21, and 24, drawn to an electronic component unit with an electronic component bonded to a board with an anisotropic conductive layer that has one portion with less inorganic filler than the other.

Group V, claim(s) 19, 55, and 59, drawn to an electronic component unit with an electronic component bonded to a board with an anisotropic conductive adhesive with two distinct layers one layer having less inorganic filler than the other.

Group VI, claim(s) 25-27, 29, 30, 33, 36-40, 64, and 69, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a bump on an electrode of an electronic component,

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mounting the electronic component to a board with an insulative resin layer, and bonding under heat and pressure with at least 20 gf per bump.

Group VII, claim(s) 28, 34, 60, 61, 65, 66, and 70, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a gold bump on an electrode of an electronic component, mounting the electronic component to a board with an insulative resin layer, metallurgically bonding the gold bump to an electrode on the board with supersonic waves and bonding under heat and pressure with at least 20 gf per bump.

Group VIII, claim(s) 31, 32, 35, and 71, drawn to an electronic component mounting method and apparatus forming a ball by an electric spark and thermocompression bonding it into a bump on an electrode of an electronic component, mounting the electronic component to a board with an insulative resin layer, and bonding under heat and pressure and lessening the pressure during the bonding.

Group IX, claim(s) 41, drawn to an electronic component unit with an electronic component bonded to a board with an insulative resin layer that has one portion with less inorganic filler than the other.

Group X, claim(s) 42, drawn to an electronic component unit with an electronic component bonded to a board with an insulative resin adhesive with two distinct layers one layer having less inorganic filler than the other.

Group XI, claim(s) 46, drawn to an electronic component mounting method mounting the electronic component with a bump to a board with an anisotropic conductive layer, and bonding under heat and pressure.

Group XII, claim(s) 47 and 49, drawn to drawn to an electronic component mounting method mounting the electronic component with a bump to a board with an insulative resin layer, and bonding under heat and pressure.

4. The inventions listed as Groups I-XII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

5. Groups I and II lack unity because all the common features are known: forming a ball at a tip of metal wire by an electric spark, forming a bump on an electrode of an electronic component by thermocompression-bonding with supersonic waves by means of a capillary, placing an anisotropic conductive film between the component and a board, and bonding the board to the component under heat and pressure that is greater than 20 gf per bump (see for example JP 10-256306) and for the anisotropic conductive film to be an insulation resin mixed with conductive particles and an inorganic filler (see for example Yamaguchi U.S. Patent 5,686,703). Group II has the special technical

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features not required of Group I of the bump being made of gold and metallicity bonding the gold bump to an electrode of the board with supersonic waves.

6. Groups I and III lack unity because all the common features are known and Group III has the special technical feature not required of Group I of reducing the pressure during the bonding step.

7. Groups I and IV and IX lack unity because they have different special technical features not required by the other. Group I requires the bump to be formed through a wire spark and thermocompression bonding and Groups IV and IX require the anisotropic conductive layer/insulative resin layer to have varying amounts of inorganic filler.

8. Groups I and V and X lack unity because they have different special technical features not required by the other. Group I requires the bump to be formed through a wire spark and thermocompression bonding and Groups V and X require the anisotropic conductive layer/insulative resin layer to have two distinct layers one having less inorganic filler than the other.

9. Groups I, and VI-X and XII lack unity because they have different special technical features not required by the other. Group I requires an anisotropic conductive layer and Groups VI-X and XII require an insulative resin layer.

10. Groups I and XI lack unity because they have different special technical features not required by the other. Group I requires the bump to be formed through a wire spark and thermocompression bonding and for the pressure to be greater than 20gf per bump.

11. Groups II and III lack unity because they have different special technical features not required by the other. Group II requires metallicity bonding the bump to the board and Group III requires reducing the pressure during the bonding step.

12. Groups II and IV and IX lack unity because they have different special technical features not required by the other. Group II requires the bump to be formed through a wire spark and thermocompression bonding and Groups IV and IX require the anisotropic conductive layer/insulative resin layer to have varying amounts of inorganic filler.

13. Groups II and V and X lack unity because they have different special technical features not required by the other. Group II requires the bump to be formed through a wire spark and thermocompression bonding and Groups V and X require the anisotropic conductive layer/insulative resin layer to have two distinct layers one having less inorganic filler than the other.

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14. Groups II, and VI-X and XII lack unity because they have different special technical features not required by the other. Group II requires an anisotropic conductive layer and Groups VI-X and XII require an insulative resin layer.

15. Groups II and XI lack unity because they have different special technical features not required by the other. Group II requires the bump to be formed through a wire spark and thermocompression bonding, for the pressure to be greater than 20gf per bump, and for metallic bonding the bump to the board.

16. Groups III and IV and IX lack unity because they have different special technical features not required by the other. Group III requires the bump to be formed through a wire spark and thermocompression bonding and Groups IV and IX require the anisotropic conductive layer/insulative resin layer to have varying amounts of inorganic filler.

17. Groups III and V and X lack unity because they have different special technical features not required by the other. Group III requires the bump to be formed through a wire spark and thermocompression bonding and Groups V and X require the anisotropic conductive layer/ insulative resin layer to have two distinct layers one having less inorganic filler than the other.

18. Groups III, and VI-X and XII lack unity because they have different special technical features not required by the other. Group III requires an anisotropic conductive layer and Groups VI-X and XII require an insulative resin layer.

19. Groups III and XI lack unity because they have different special technical features not required by the other. Group III requires the bump to be formed through a wire spark and thermocompression bonding and for the pressure to be reduced during bonding.

20. Groups IV and V lack unity because they have different special technical features not required by the other. Group IV require one anisotropic conductive layer with different portions have different amounts of inorganic filler and Group V requires the anisotropic conductive adhesive to have two distinct layers, one having more inorganic filler than the other.

21. Groups IV and V and VI-X and XII lack unity because they have different special technical features not required by the other. Groups IV and V require an anisotropic adhesive layer and Groups VI-X and XII require an insulative resin layer.

22. Groups IV and XI lack unity because they have different special technical features not required by the other. Groups IV requires different portions of the anisotropic conductive layer to have varying amounts of inorganic filler.

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23. Groups V and XI lack unity because they have different special technical features not required by the other. Group V requires the anisotropic conductive adhesive to have two distinct layers, one having more inorganic filler than the other.

24. Groups VI and VII lack unity because they have different special technical features not required by the other. Group VII requires the bump being made of gold and metallically bonding the gold bump to an electrode of the board with supersonic waves.

25. Groups VI and VII, and VIII lack unity because they have different special technical features not required by the other. Group VIII requires reducing the pressure during the bonding.

26. Groups VI-VIII and IX lack unity because they have different special technical features not required by the other. Group IX requires different portions of the insulative resin layer to have varying amounts of inorganic filler.

27. Groups VI-VIII and X lack unity because they have different special technical features not required by the other. Group X requires the insulative resin layer to have two distinct layers, one having more inorganic filler than the other.

28. Groups VI-VIII and XI-XII lack unity because they have different special technical features not required by the other. Groups VI-VIII require the bumps to be formed through a wire spark and thermocompression bonding.

29. Groups IX and X lack unity because they have different special technical features not required by the other. Group IX requires one insulative resin layer with different portions have different amounts of inorganic filler and Group X requires the insulative resin adhesive to have two distinct layers, one having more inorganic filler than the other.

30. Groups IX and X and XI lack unity because they have different special technical features not require by the other. Groups IX and X require an insulative resin layer and Group XI requires an anisotropically conductive layer.

31. Groups IX and XII lack unity because they have different special technical features not required by the other. Group IX requires one insulative resin layer with different portions have different amounts of inorganic filler.

32. Groups X and XII lack unity because they have different special technical features not required by the other. Group X requires the insulative resin adhesive to have two distinct layers, one having more inorganic filler than the other.

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33. Groups XI and XII lack unity because they have different special technical features not required by the other. Groups XII require an insulative resin layer and Group XI requires an anisotropically conductive layer.

34. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

**35. It is noted the rejoinder of the claims will be considered upon the indication of allowable subject matter and the basis thereof.**

36. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(703) 305-0052**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

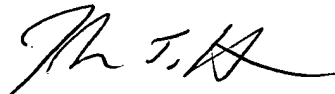
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703)



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872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



John T. Haran

February 14, 2003

  
Michael W. Ball

Supervisory Patent Examiner  
Technology Center 1700